

REMARKS

Claims 1-23 were pending in the application. Claims 1, 6, 8-11, 13, 16-18, and 21 have been amended. Claims 24 and 25 have been added. Accordingly, claims 1-25 are pending subsequent entry of the present amendment.

DRAWINGS

Formal drawings accompany the present amendment.

35 U.S.C. § 112 REJECTIONS

In the present Office Action, claim 13 is rejected as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 13 has been amended in a manner which is believed to overcome the rejection.

35 U.S.C. § 103(a) REJECTIONS

In the present Office Action, claims 1-8, 11, 14, 15, and 18-23 stand rejected as being unpatentable over Graves et al. US 20020196506 A1 (hereinafter "Graves") in view of Akkapeddi US 4949056 A (hereinafter "Akkapeddi"). Claims 9 and 10 stand rejected as being unpatentable over Graves and Akkapeddi as applied to claim 1 and in further view of Fukuchi US 20020064340 A1 (hereinafter "Fukuchi"). Claims 12 and 13 stand rejected as being unpatentable over Graves and Akkapeddi as applied to claim 11 and in further view of Day US 6266464 B1 (hereinafter "Day"). Applicant respectfully traverses the above rejections and requests reconsideration in view of the following discussion.

A *prima facie* case of obviousness of a claimed invention is not established unless all the claim limitations are taught or suggested by the cited prior art. Applicant submits that each of the pending claims recite a combination of features neither taught nor suggested by the cited art. With respect to prior claims 9 and 10, the Examiner states the following in paragraph 6 of the present office action:

“Re claim 9 and 10, the modified invention of Graves and Akkapeddi does not disclose an Erbium-doped amplifier and semiconductor amplifier. Fukuchi disclosed such amplifiers used to magnify the gain of fiber optic system, see paragraph 0116. It would have been obvious to one of ordinary skill in the art at the time of invention to employ the Fukuchi amplifiers in the modified invention since these are common amplifiers that exhibit superior properties in fiber optic transmission systems.”

However, while various types of amplifiers are disclosed by Fukuchi, Applicant notes that prior claim 9 actually recites: “wherein said optical amplifier is **a combination of a Raman amplifier and an Erbium-doped amplifier.**” Further, as recited in claim 1, this combination amplifier is coupled to a transmitter. Applicant respectfully submits that the cited references neither teach nor suggest a combination optical amplifier as recited. In contrast, Fukuchi discloses:

“The WDM repeater 30 is provided in the optical fiber OF1 to amplify the **first WDM light L1 and the second WDM light L2 traveling in opposite directions** within the optical fiber OF1, allowing long distance transmission. ...

The WDM repeater 30 includes a coupler 31, a semiconductor laser 32, a wavelength band coupler 33, **a Thulium-doped fiber amplifier 34, an Erbium-doped fiber amplifier 35,** and a wavelength band coupler 36.

... the first WDM light L1 is amplified by the thulium-doped fiber amplifier 34. ...

On the other hand, **the second WDM light L2 received from the WDM transceiver 20 enters the Erbium-doped fiber amplifier 35** though the wavelength band coupler 36.” (Fukuchi, par. 0082-0085). (emphasis added).

Thus, while Fukuchi discloses the use of two amplifiers, each is used for a different purpose. In particular, amplifier 34 amplifies light L1 and amplifier 35 amplifies light L2. Amplifiers 34 and 35 are distinct and are part of separate paths provided for light traveling in opposite directions. Accordingly, the cited art does not teach or suggest the features of prior claim 9.

In the present amendment, Applicant has amended claim 1 to recite a combination of features similar to that of prior claim 9. For example, claim 1 has been amended to recite a combination optical amplifier coupled to a transmitter as follows:

“a combination optical amplifier coupled to said fiber optic cable and configured to amplify **said optical signal**; wherein said combination optical amplifier comprises at least: a first optical amplifier having a maximum gain at a first wavelength; and a second optical amplifier having a maximum gain at a second wavelength different from the first wavelength; and **a transmitter coupled to said combination optical amplifier** and configured to transmit said amplified optical signal across a free space medium.”

It is noted that the recited combination optical amplifier amplifies a specific optical signal on the transmission side of the optical communication system. Accordingly, both the first optical amplifier and the second optical amplifier of the combination optical amplifier amplify the same optical signal. Applicant finds no teaching or suggestion in the cited art, either singly or in combination, of a combination optical amplifier ... configured to amplify said optical signal ... to which a transmitter is coupled. Rather, each of Fukuchi's optical amplifiers amplifies a different WDM light and they are not coupled to a single transmitter. Therefore, claim 1 is patentably distinguished from the cited art for at least the above reasons as well. Still further, as each of independent claims 11 and 18 recite features similar to that of claim 1, each of claims 11 and 18 are believed patentable as well. As each of dependent claims 2-10, 12-17, and 19-20 include the features of the independent claims upon which they depend, each of

claims 2-10, 12-17, and 19-20 are believed patentable for at least the reasons above as well.

In addition to the above, with respect to the amplifier coupled to the transmitter, each of claims 1, 11, and 18 further recite:

“wherein said combination optical amplifier comprises at least:
a first optical amplifier having a maximum gain at a first wavelength; and
a second optical amplifier having a maximum gain at a second wavelength
different from the first wavelength.”

Support for these features may be found in the description, including at pages 10-11 and the discussion associated with FIGs. 4A-4B. Applicant submits these features are neither taught nor suggested by the cited art.

ALLOWABLE SUBJECT MATTER

In the present Office Action, claims 16 and 17 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Applicant has added new claim 25 that includes all of the features of original claim 16 and original independent claim 11 upon which it depended. Accordingly, claim 25 is in condition for allowance.

Claim 24 has also been added and includes the limitations of original claims 11 and 16 with the exception being that the originally recited “Raman optical amplifier” is recited as an “optical amplifier”. Applicant believes claim 24 is allowable even with this change in recitation. Both new claims 24 and 25 are therefore believed to be in condition for allowance.

Finally, Applicant has amended independent claim 21 to include features similar to that of allowable claim 16. In particular, claim 1 has been amended to recite:

“...a dense wavelength division multiplexing (DWDM) module coupled to said fiber optic cable and configured to receive a plurality of data signals and multiplex all of said plurality of data signals into said optical signal, wherein each of said plurality of signals is transmitted at an orthogonal wavelength, said orthogonal wavelengths being in the near IR range; ...”

Accordingly, Applicant submits that claim 21, as amended, is now in condition for allowance for reasons similar to that of claim 24. As each of claims 22 and 23 includes at least the limitations of independent claim 21, each of claims 22 and 23 is believed patentable as well.

CONCLUSION

Applicants submit the application is in condition for allowance, and an early notice to that effect is requested.

If any fees are due, the Commissioner is authorized to charge said fees to Meyertons, Hood, Kivlin, Kowert, & Goetzel, P.C. Deposit Account No. 501505/5957-16300/RDR.

Also enclosed:

- ☒ Two-Month Extension of Time
- ☒ Fee Authorization
- ☒ Transmittal of Power of Attorney and Notice of Change of Address
- ☒ Formal Drawings (5 Sheets; Figures 1-6)

Respectfully submitted,



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IN THE DRAWINGS

Responsive to the examiner's request, Applicant submits herewith formal drawings.